Application Number: 10/821,769
Amendment Dated: October 10, 2007
Reply to Office Action Dated: April 10, 2007

REMARKS

This amendment is responsive to the Office Action dated April 10, 2007, for which a three (3) month period of response was given. A petition and fee for a three (3) month extension of time accompany this paper. However, should any additional fees, or petitions be due, this paper the Commissioner is hereby authorized to charge this fee and any other necessary fees to, to Deposit Account No. 50-0959, Docket Number 089498.0354.

Claims 1, 2, 4, 5 and 7 through 20 are pending in the present application upon entry of the above amended claims. Claims 3, 6 and 21 through 30 have been, or were previously, cancelled. Claims 1 and 12 have been amended to more clearly state the nature of the present invention. Support for the amendments to claims 1 and 12 exists in the specification and Figures as filed (*see, e.g.*, Figures 2 and 3). Accordingly, entry and consideration of the amendments to the claims, and the remarks which follow, is believed due and is respectfully requested.

I. The 35 U.S.C. § 102(b) Rejections:

Claims 1, 2, 4, 5, and 9 through 20 have been rejected under 35 U.S.C. § 102(b) over Fish (United States Patent No. 6,454,251). Specifically, the Examiner contends that Fish discloses a spring wire comprising a core that includes a plurality of fiber tows and an outer layer of resin that is substantially devoid of the fiber tows. Furthermore, the Examiner contends that the spring wire has a constant thickness and cross-sectional shape, and is generally uniform and free of surface irregularities. Applicant respectfully disagree.

Upon reviewing Fish, it is apparent that Fish does not disclose a spring having a constant thickness, or a uniform and smooth surface, where the uniform and smooth surface is the result of a combination of a resin outer layer and a core. Nor does Fish disclose the presently claimed resin outer layer as is recited in pending claims 1 and 12.

As can be seen from Figure 2C and column 4, lines 50 through 56 of Fish, this is because the spring structure disclosed therein utilizes a petal-shaped fiber core 10 that is partially surrounded by discontinuous resin areas 12 which are referred to in Fish as resin pathways 12 because portions of the fiber core 10 clearly contact cladding layer 1 (emphasis added). This embodiment also includes, as pointed out by the Examiner, a

cladding layer 1 formed from a suitable material such as flexible thermoplastic tubing or copper. Finally, with regard to Fish none of the other spring embodiments disclosed therein correct the deficiencies associated with the embodiment of Figure 2C.

Given the above, Fish clearly fails to disclose, teach or suggest a fiber-reinforced composite spring as recited in pending claims 1 and 12 where such a spring contains a core-resin outer layer combination where the resin outer layer is free of fiber tows and is in direct contact with at least one of the plurality of fiber tows contained in the core and where the resin outer layer-core combination has a constant thickness and cross-sectional shape, and is generally uniform, smooth, and free of any surface irregularities (emphasis added). Since Fish fails to disclose or suggest each and every element of the presently claimed invention, Fish can not anticipate or render obvious claims 1, 2, 4, 5, and 9 through 20. Accordingly, withdrawal of this rejection is believed due and is respectfully requested.

Claims 1, 2, 4, 5, and 8 through 20 have been rejected under 35 U.S.C. § 102(b) over Reinhart et al. (United States Patent No. 2,852,424). Specifically, the Examiner asserts that Reinhart et al. discloses a spring wire comprising a core that includes a plurality of fiber tows. Furthermore, the Examiner contends that Reinhart et al. discloses an outer layer of resin that is substantially devoid of the fiber tows because fiber tows that are saturated with resin must inherently have a layer of resin. Additionally, the Examiner contends that the spring wire set forth in Reinhart et al. has a constant thickness and cross-sectional shape, and is generally uniform and free from surface irregularities. In this regard, the Examiner asserts that the cladding set forth in Reinhart et al. would inherently provide an extremely smooth outer surface and constant cross-sectional shape. Applicants respectfully disagree.

Initially, the Examiner has no basis for asserting that an "extremely smooth outer surface and constant cross-sectional shape" is inherent to any structure disclosed in Reinhart et al. To the contrary, Reinhart et al. discloses the opposite. Specifically, Reinhart et al. discloses soaking glass rovings in a trough of resin, and then drawing them through a tube (see column 2, lines 29 through 37). Given this disclosure, one of ordinary skill in the art would readily recognize that this process would clearly result in an irregular and textured surface. This is because, by nature of the production process disclosed

therein, fibers must be in contact with inner the surface of the tubing 12. Thus, no resin outer layer that meets the criteria recited in pending claims 1 and 12 can exist in the springs of Reinhart et al.

Furthermore, in the absence of some effort to place an additional gap-filling layer of resin between the fibers and the tubing disclosed in Reinhart et al. a smooth layer as suggested by the Examiner would not occur. Additionally, given the disclosure contained in Reinhart et al. one of ordinary skill in the would not have been motivated to form the core-resin outer layer combination as recited in pending claims 1 and 12. This is because Reinhart et al. does not disclose a discrete and continuous resin outer layer but instead discloses that fibers are present throughout all of the inner core. This position is further substantiated by Figure 3 of Reinhart et al. that clearly shows rovings 14 throughout central resin 10.

Given the above, Reinhart et al. clearly fails to disclose, teach or suggest a fiber-reinforced composite spring as recited in pending claims 1 and 12 where such a spring contains a core-resin outer layer combination where the resin outer layer is free of fiber tows and is in direct contact with at least one of the plurality of fiber tows contained in the core and where the resin outer layer-core combination has a constant thickness and cross-sectional shape, and is generally uniform, smooth, and free of any surface irregularities (emphasis added). Since Reinhart et al. fails to disclose or suggest each and every element of the presently claimed invention, Reinhart et al. can not anticipate or render obvious claims 1, 2, 4, 5, and 8 through 20. Accordingly, withdrawal of this rejection is believed due and is respectfully requested.

Claims 1, 2, 4, 5, and 9 through 20 have been rejected under 35 U.S.C. § 102(b) over Hashimoto (United States Patent No. 4,473,217). Specifically, the Examiner asserts that Hashimoto discloses a fiber-reinforced resin coil spring impregnated with thermosetting resin. In detail, the Examiner asserts that the spring of Hashimoto includes a resin-impregnated and twisted rod-shaped fiber bundle formed by bundling a plurality of fiber wire blanks made of glass or carbon, immersing the fiber bundle and twisting the rod-shaped fiber bundle in a thermosetting resin, and forming coiled twisted rod-shaped fiber bundle from the resin-immersed and twisted rod-shaped fiber bundle. The Examiner points

out that a "generally" uniform surface is obtained in Hashimoto by covering the twisted rod-shaped fiber bundle with a water-soluble vinyl alcohol tape. Additionally, the Examiner also claims that Hashimoto discloses an outer layer of resin that is substantially devoid of fiber tows. Applicant respectfully disagree.

Given the disclosure contained in Hashimoto, there is no sound basis for stating that the springs made in accordance with the process disclosed Hashimoto contain a resin outer layer that is free of fiber tows. This is because no such layer is disclosed in the Figures of Hashimoto nor is such a layer discussed therein. This position is further substantiated by the disclosure contained at column 2, line 45 to column 3, line 37 of Hashimoto where no reference is made to any outer resin layer that is free of fiber tows.

Additionally, even assuming the Examiner's position regarding Hashimoto is correct (which Applicants are not), the structures disclosed in Hashimoto clearly fail to disclose, teach or suggest a resin outer layer-core combination that has a constant thickness and cross-sectional shape, and is generally uniform, smooth, and free of any surface irregularities. This is because Hashimoto only discloses wrapping the central fiber bundle with a vinyl alcohol-based tape 4 or a resin-impregnated fiber structure 21. As would be clear to one of ordinary skill in the art, neither of these "outer coverings" would yield the resin outer layer-core combination of the present invention as is recited in pending claims 1 and 12. Thus, it is clear that the springs of Hashimoto must have surface irregularities once its outer covering is removed.

Given the above, Hashimoto clearly fails to disclose, teach or suggest a fiber-reinforced composite spring as recited in pending claims 1 and 12 where such a spring contains a core-resin outer layer combination where the resin outer layer is free of fiber tows and is in direct contact with at least one of the plurality of fiber tows contained in the core and where the resin outer layer-core combination has a constant thickness and cross-sectional shape, and is generally uniform, smooth, and free of any surface irregularities (emphasis added). Since Hashimoto fails to disclose or suggest each and every element of the presently claimed invention, Hashimoto can not anticipate or render obvious claims 1, 2, 4, 5, and 9 through 20. Accordingly, withdrawal of this rejection is believed due and is respectfully requested.

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Claims 1, 2, 4, 5, and 10 through 20 have been rejected under 35 U.S.C. § 102(b) over Taylor (United States Patent No. 4,991,827). Specifically, the Examiner asserts that Taylor discloses a spring consisting of a rope having a plurality of strands each containing a plurality of monofilaments, and a cured binder which has saturated the rope under pressure to cause it to be self-sustaining in spring form, where such binder forms a outer layer of resin that is substantially free of fiber tows. Applicants respectfully disagree.

Given the disclosure contained in Taylor, there is no sound basis for stating that the springs made in accordance with the process disclosed Taylor contain a resin outer layer that is free of fiber tows. This is because no such layer is disclosed in the Figures of Taylor nor is such a layer discussed therein. This position is further substantiated by the disclosure contained in Taylor where the fiber tows are shown to contact the inner surface of tube 15 or fiber-based strands 24 and 30.

Additionally, even assuming the Examiner's position regarding Taylor is correct (which Applicants are not), the structures disclosed in Taylor clearly fail to disclose, teach or suggest a resin outer layer-core combination that has a constant thickness and cross-sectional shape, and is generally uniform, smooth, and free of any surface irregularities. This is because Taylor only discloses discontinuous resin portions that are contained, along with a fiber core, within a tube 15 or a fiber-based strand 24/30. As would be clear to one of ordinary skill in the art, none of these "outer coverings" would yield the resin outer layer-core combination of the present invention as is recited in pending claims 1 and 12. Thus, it is clear that the springs of Taylor must have surface irregularities once its outer covering is removed.

Given the above, Taylor clearly fails to disclose, teach or suggest a fiber-reinforced composite spring as recited in pending claims 1 and 12 where such a spring contains a core-resin outer layer combination where the resin outer layer is free of fiber tows and is in direct contact with at least one of the plurality of fiber tows contained in the core and where the resin outer layer-core combination has a constant thickness and cross-sectional shape, and is generally uniform, smooth, and free of any surface irregularities (emphasis added). Since Taylor fails to disclose or suggest each and every element of the presently claimed invention, Hashimoto can not anticipate or render obvious claims 1, 2, 4, 5, and 9 through

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20. Accordingly, withdrawal of this rejection is believed due and is respectfully requested.

II. The 35 U.S.C. § 103(a) Rejections:

Claim 7 has been rejected under 35 U.S.C. § 103(a) over the following combinations of cited art: (i) Fish (United States Patent No. 6,454,251) and Petrina (United States Patent No. 6,612,556); (ii) Taylor (United States Patent No. 4,991,827) and Petrina (United States Patent No. 6,612,556); (iii) Hashimoto (United States Patent No. 4,473,217) and Petrina (United States Patent No. 6,612,556); and (iv) Reinhart et al. (United States Patent No. 2,852,424) and Petrina (United States Patent No. 6,612,556).

Initially, the teachings of Fish, Taylor, Hashimoto and Reinhart et al. are discussed in detail above. Also of note is that, at a minimum, all of Taylor, Hashimoto and Reinhart et al. disclose only springs that contain therein surface irregularities.

Turning to Petrina, Petrina discloses a single spring unit that includes a multi-helical spring formed of a composite material where such springs can have rectangular cross-sectional shapes. It should be noted that disclosure of Petrina fails to disclose, teach or suggest a core-resin outer layer combination where the resin outer layer is free of fiber tows and is in direct contact with at least one of the plurality of fiber tows contained in the core and where the resin outer layer-core combination has a constant thickness and cross-sectional shape, and is generally uniform, smooth, and free of any surface irregularities (emphasis added). As such, the teachings of Petrina fails to cure the deficiencies of Fish, Taylor, Hashimoto and Reinhart et al.

Accordingly, in light of the above, claim 7 is patentable over the various above-noted combinations of Fish, Taylor, Hashimoto and Reinhart et al. with Petrina, and as such withdrawal of these rejections is believed due and is respectfully requested.

III. Conclusion:

Accordingly, reconsideration and withdrawal of the 35 U.S.C. § 102(b) rejections, and the 35 U.S.C. § 103(a) rejections is believed due and is respectfully requested.

For at least the foregoing reasons, the present application is believed to be in condition for allowance, and a Notice of Allowance is respectfully requested.

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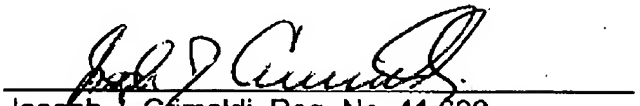
Should the Examiner wish to discuss any of the foregoing in more detail, the undersigned attorney would welcome a telephone call.

Respectfully submitted,



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